MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
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Gaithersburg, Maryland 20899-2320

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SRM Number: 2062
MSDS Number: 2062
SRM Name: TiAl(NbW) Alloy

Date of Issue: 16 May 2005

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: Standard Reference Material (SRM) 2062 is intended for use in X-ray fluorescence analysis of titanium-aluminum (Ti-Al) aerospace alloys although it may be a useful reference for other methods of analysis. A unit of SRM 2062 consists of a flat, polished disk approximately 2.4 cm diameter and 2 mm thick of the alloy, TiAl(NbW).

Substance: TiAl(NbW) Alloy

Other Designations: **Ti** (titanium; titanium element) **Al** (aluminum) **Nb** (niobium element; columbium) **W** (tungsten element) **Alloy**

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Number	EC Number (EINECS)	Nominal Concentration (mass %)
Titanium	7440-32-6	231-142-3	53.92
Aluminum	7429-90-5	231-072-3	30.31
Niobium	7440-03-1	231-113-5	10.78
Tungsten	7440-33-7	231-143-9	4.38

SRM 2062 EC Classification: Not determined.

3. HAZARDS IDENTIFICATION

Major Health Hazards: Not expected to be a health hazard. No significant target effects reported.

Physical Hazards: SRM 2062 is a negligible fire and explosion hazard in bulk form. Dust/air mixtures are flammable.

Potential Health Effects

Eye Contact: Dust or powder may cause irritation.

Skin Contact: May cause irritation and redness.

Inhalation: Inhalation of powder/dust may cause irritation of the respiratory tract, coughing, and difficulty breathing.

Ingestion: Not expected to be a health hazard when ingested due to poor absorption from the alimentary tract. May cause nausea and vomiting due to irritation of the gastrointestinal tract.

Listed as a Carcinogen/ Potential Carcinogen:

Yes	No	
____	X	In the National Toxicology Program (NTP) Report on Carcinogens.
____	X	In the International Agency for Research on Cancer (IARC) Monographs.
____	X	By the Occupational Safety and Health Administration (OSHA).

4. First Aid Measures

Skin Contact: Wash skin with soap and water for at least 15 minutes. Obtain medical assistance, if needed.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance, if needed.

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing by qualified personnel. Get immediate medical attention.

Ingestion: If a large amount is swallowed, get medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may be flammable.

Extinguishing Media: Dry powder, dry sand, soda ash, graphite, and sodium chloride.

Fire Fighting: Keep unnecessary people away, isolate hazard area, and deny entry. Fight fires from a remote or explosive resistant location. Wear protective clothing and breathing equipment appropriate for the surrounding fire.

Flash Point: Not applicable.
Method Used: Not applicable.

Autoignition Temperature: Not applicable.

Flammability Limits in Air
Upper (Volume %): Not applicable.
Lower (Volume %): Not applicable.

6. Accidental Release Measures

Occupational Release: Collect spilled material in appropriate container for disposal. Avoid generating dust.

Disposal: Refer to section 13, "Disposal Considerations".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards. Store in a cool, dry location. Keep separated from incompatible substances. Use methods to minimize dust.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection". Avoid contact with skin, eyes, and clothing.

8. Exposure Controls and Personal Protection

Exposure Limits
Titanium: No occupational exposure limits established.

Aluminum:
ACGIH (TLV): 10 mg/m^3 TWA
OSHA (PEL): 15 $mg(Al)/m^3$ TWA (metal) (total dust)
OSHA (PEL): 5 $mg(Al)/m^3$ TWA (metal) (respirable fraction)
NIOSH: 10 mg/m^3 recommended TWA (10 h) (total particulate)
NIOSH: 5 mg/m^3 recommended TWA (10 h) (respirable fraction)
OES UK: 10 mg/m^3 TWA (total inhalable dust)
OES UK: 4 mg/m^3 TWA (respirable dust)

Niobium: No occupational exposure limits established.

Tungsten: ACGIH (TLV): 5 mg/m^3 TWA
ACGIH (TLV): 10 mg/m^3 STEL
NIOSH: 5 mg/m^3 recommended TWA (10 h)
NIOSH: 10 mg/m^3 recommended STEL
OES UK: 5 mg/m^3 TWA
OES UK: 10 mg/m^3 STEL

Ventilation: Use a local exhaust ventilation system if significant dusting occurs. Ventilation equipment should be explosion-resistant.

Respirator: Respiratory protection may be needed under conditions of frequent use or heavy exposure when dusting occurs.

Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory. An eye wash station should be readily available near the handling and use areas.

Personal Protection: Wear appropriate chemically resistant gloves and protective clothing to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: TiAl(NbW)

Appearance and Odor: Metallic solid. No odor.

10. STABILITY AND REACTIVITY

Stability: X Stable ____ Unstable

SRM 2062 is stable under normal temperatures and pressure.

Conditions Under Which Product May Be Unstable: Dust/air mixtures are flammable.

Incompatible Materials: Acids. Bases. Oxidizing materials. Halogens. Halocarbons. Metal salts. Metal oxides.

Other Conditions to Avoid: When dust is formed, avoid heat, flames, sparks, and other sources of ignition.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition Products: Thermal decomposition may form miscellaneous decomposition products.

Hazardous Polymerization: ____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data, Niobium: Rat, Oral LD: > 10 g/kg

Health Hazards (Acute and Chronic): See Section 3, "Hazards Identification," for potential health effects.

12. ECOLOGICAL INFORMATION

Aluminum Ecological Data

Fish Toxicity: Golden trout (Oncorhynchus aguabonita) LETH (mortality): 293 μg/L (7 h)

Invertebrate Toxicity: Water flea (Daphnia pulex) LC_{50} (mortality): 2 600 μg/L (24 h)

Phytotoxicity: Water-milfoil (Myriophyllum spicatum) EC_{50} (biomass): 2 500 μg/L (32 d)

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable regulations. Titanium is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Numbers D001 and D003. Niobium is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number D001.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Aluminum.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE (health):	No.
CHRONIC (health):	No.
FIRE (physical):	Yes. (powder/dust)
REACTIVE (physical):	No.
SUDDEN RELEASE (physical):	No.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

State Regulations: California Proposition 65: Not regulated.

CANADIAN Regulations: WHMIS Classification: Not determined.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Titanium,* 15 December 2003.
MDL Information Systems, Inc., MSDS *Aluminum*, 18 March 2004.
MDL Information Systems, Inc., MSDS *Niobium*, 15 December 2003
MDL Information Systems, Inc., MSDS *Tungsten,* 15 December 2003.